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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/034,566      | 12/28/2001  | Heikki Heikkila      | 15192               | 1552             |

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Garden City, NY 11530

EXAMINER

FORTUNA, ANA M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1723

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/034,566

Applicant(s)

HEIKKILA ET AL.

Examiner

Ana M Fortuna

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☒ Claim(s) 5-42 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☒ Certified copies of the priority documents have been received in Application No. 4.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5, 6. 6) ☐ Other:

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 5-42 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim (s). See MPEP § 608.01(n). Accordingly, the claims 5-42 have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 112***

2. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim s 3-4 recites the broad

recitation xylose content of over 1.1, and the claim also recites preferably 1.5 times and more preferably 2.5 times which is the narrower statement of the range/limitation.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lombard (6,409,841 B1)(hereinafter '841) in view of Pedersen et al (6,329,182 B1 (hereinafter '182), and Lindroos et al (6,086,681)(hereinafter '681).

Reference '841 discloses the production of organic products from a biomass fermentation product, e.g. from lignocelluloses containing biomass, the biomass containing saccharine, e.g. sugars (abstract, column 5, lines 23-54), processing of the biomass by filtration with membrane to remove volatile organic and other products, and concentrate sugars is also disclosed. Treating the biomass hydroxylate by nanofiltration membrane with molecular weight cutoff designed to concentrate sugars and polysaccharides fragments in a multistage treatment, and produce an aqueous permeate (column 5, last paragraph, through column 6, and column 7, lines 1-45). '841 also teach optional pretreatment of the hydrolysate with microfiltration, ultrafiltration or the combination of ultrafiltration and nanofiltration (column 13, lines 43-68, and

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column 14, lines 1-10). '841 fail to suggest recovering any sugar as permeate from the process.

Lindroos et al ('681) teaches a method of production of xylose from a biomass product containing the xylose (column 1, lines 20-32), and recovery of xylose from by products by ultrafiltration, in the ultrafiltration permeate, follow by further crystallization (column 3, lines 19-27). The treatment of the xylose solution purified by ultrafiltration in a nanofiltration membrane is not suggested or disclosed in '681.

Pedersen et al ('182 ) teaches treatment of solution containing mono and polysaccharides (abstract, column 3, lines 44) to retain polysaccharides and produce and aqueous solution containing monossacharide including xylose, by nanofiltration (selected to permeate xylose between other monossacharide (column 7, lines 1-30, and column 8, lines 10-16).

It would have been obvious to one skilled in the art at the time the invention was made to modify the process of '841, e.g. from separating mono and polysaccharides contained in the biomass product in a nonofiltration membrane, e.g. by selecting a membrane capable of permeating monossaccharides, as suggested by reference '182, e.g. a membrane of Desal 5 series (column 6, lines 43).

It would have been further obvious to one skilled in the art at the time the invention was made to modify the process of '681, which includes the production of sylose , purification by ultrafiltration to produce a purified permeate containing xylose which is further crystallized, by substituting the crystallization process with a further concentration process including nanofiltration capable of permeating xylose and

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retaining polyssacharides and other undesirable products, as suggested by '182, e.g., by providing a Desal 5 membrane, and selecting the molecular weight cutoff between 300-1000 (column 6, first paragraph, and lines 29-43).. Modifying the process of '841 in view of '182, e.g. for alternative recovering monosaccharide sugars from the biomass, e.g. by treating the sugar concentrate with a nanofiltration membrane of the Desal 5 series, it would have been obvious to one skilled in the art at the time the invention was made. Regarding claim 2, rejection of polyvalent ions and polyssacharides /oligosacharides by the nanofiltration membrane is disclosed in '182 (column 6, lines 1-34). Regarding claim 3, the final product content of xylose is not disclosed in the prior art, however, reference '182 suggest further treatment of the permeate in a second nanofiltration membrane in a recycling circuit, it would have been obvious to one skilled in the art at the time the invention was made to concentrate by adding cumulative filtration steps, further adding reverse osmosis or evaporation to the process as conventional concentration steps. As to claim 4, the addition of multiple steps or recycling steps for further purification /or concentration would be cumulative to achieve a predetermined concentration.

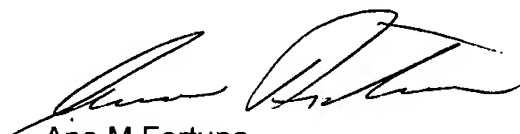
### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional references are considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M Fortuna whose telephone number is (703) 308-3857. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (703) 308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Ana M Fortuna  
Primary Examiner  
Art Unit 1723

AMF